

Applicant: Warren
For: Foldable Member

1 1. A foldable member comprising:
2 at least a first tube;
3 at least one predetermined hinge area along the length of the
4 first tube; and
5 opposing sets of elongated slots in the tube at the hinge area
6 thereof forming separated longitudinal strips of tube
7 material between the slots which fold when subjected to localized
8 buckling forces,
9 each slot of each set of elongated slots separated
10 longitudinally along the length of the tube from each adjacent slot by
11 a bridge element of tube material.

1 2. The foldable member of claim 1 in which the opposing sets of elongated
2 slots are diametrically opposed from each other on the tube.

1 3. The foldable member of claim 1 in which each slot in each set of slots is
2 diametrically opposed from a slot in the opposing set of slots.

1 4. The foldable member of claim 1 in which there are two sets of slots.

1 5. The foldable member of claim 4 in which there are two slots in each set of

2 slots.

1 6. The foldable member of claim 1 in which there are two sets of slots and
2 two slots in each set.

1 7. The foldable member of claim 1 in which there is a stress relieving
2 member attached to each bridge element on the inside of the tube.

1 8. The foldable member of claim 1 in which the tube is made of a plastic
2 material.

1 9. The foldable member of claim 1 in which the tube is made of a composite
2 material.

1 10. The foldable member of claim 9 in which the composite material includes
2 a triaxial braid of fibers in a resin matrix.

1 11. The foldable member of claim 1 in which there are a plurality of hinge
2 areas spaced from each other along the length of the tube, each hinge area including
3 opposing sets of elongated slots.

1 12. The foldable member of claim 1 further including an electrical conductor
2 disposed in the tube.

1 13. The foldable member of claim 1 further including at least one transducer
2 device located proximate a hinge area for controlling the folding of the longitudinal strips
3 of tube material.

1 14. The foldable member of claim 1 further including slot reinforcing
2 members disposed in the slots.

1 15. The foldable member of claim 1 in which the elongated slots are triangle
2 shaped.

1 16. The foldable member of claim 1 in which the elongated slots are diamond
2 shaped.

1 17. The foldable member of claim 1 in which there are four slots in each set of
2 slots, each slot of a pair of the four slots opposing another slot.

1 18. The foldable member of claim 1 in which each slot has a reduced diameter
2 portion.

1 19. The foldable member of claim 1 further including a second tube disposed

- 1 21. A collapsible structure comprising:
 - 2 a plurality of joined members;
 - 3 a selected number of said members each including:
 - 4 a tube;
 - 5 at least one predetermined hinge area along the
 - 6 length of the tube; and
 - 7 opposing sets of elongated slots in the tube at the hinge area
 - 8 thereof forming separated longitudinal strips of tube material
 - 9 between the slots which fold when subjected to localized buckling
 - 10 forces,
 - 11 each slot of each set of elongated slots separated
 - 12 longitudinally along the length of the tube from each adjacent slot by
 - 13 a bridge element of tube material.

1 22. A foldable member comprising:
2 at least a first tube made of layers of material;
3 at least one predetermined hinge area along the length of the first
4 tube; and
5 a plurality of opposing elongated slots in the tube through the
6 layers of material forming separated longitudinal strips of layers of tube
7 material between the slots which fold when subjected to localized
8 buckling forces.

1 23. The foldable member of claim 22 in which first tube includes a sheet of
2 plastic material wrapped around itself several times forming the layers of tube material.

1 24. The foldable member of claim 23 further including an adhesive securing
2 the layers of plastic material to each other at selected locations along the length of the
3 tube.

1 25. The foldable member of claim 24 in which the adhesive is a tape.

1 26. The foldable member of claim 24 in which the sheet of plastic material
2 comes from a roll of plastic stock material and has a round memory.

1 27. The foldable member of claim 22 in which the layers of material are
2 laminated to each other except at the predetermined hinge area.